UMD Department of Chemistry & Biochemistry
Spring 2021 Seminar Series
Friday, March 5, 2021
3:30 p.m. Remote via Zoom

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Evaluation of Interdisciplinary Problem-Solving Skills of Chemistry and Biochemistry Majors

Real-world applications of science are often interdisciplinary, involving overlapping concepts from multiple STEM fields. However, undergraduates majoring in science are taught these concepts in separate courses, one for each field, and their performance is then evaluated by asking them to solve problems in each subdiscipline separately. This approach is often not effective in explicitly relating the subdisciplines of STEM to interdisciplinary applications in industry or academic research. Therefore, our siloed approach to teaching and evaluating STEM students leaves us with an unassessed, but very important question: How well can STEM graduates solve problems at the intersections between STEM subfields? To begin addressing this question, we first turn to the intersections and interdisciplinary problems that exist within our own field: Chemistry and Biochemistry. To assess students' interdisciplinary problem-solving skills among the subdisciplines of chemistry, we have developed a novel instrument. Each item in the instrument is designed so that it requires an understanding of principles of multiple branches of chemistry and utilizes problem-solving skills necessary in real-world applications and research. To measure the reliability of the instrument, validation studies are being conducted. Feedback obtained from validation studies will be used to optimize the instrument. The optimized instrument is intended to be administered on graduating seniors and the data obtained will be used in item analysis and factor analysis. It is anticipated that the results obtained from the study could be used to interpret the output of undergraduate chemistry education and introduce appropriate reforms to the undergraduate curriculum.